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# **AGRICULTURE AND TRADE OF**

# ***PARAGUAY***

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# AGRICULTURE AND TRADE OF PARAGUAY

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Paraguay imports most of its wheat needs and is also a market for small quantities of dairy products, fruits, vegetables, processed foods, wool, and other agricultural commodities. Its economy rests on agriculture, however, and farm commodities such as meats, hides, cotton, vegetable oils, sugar, and essential oils make up two-thirds of all export value. About one-half of the labor force of the country is engaged directly in agricultural pursuits, and more than a third of the national income is derived from agriculture. The processing of farm products accounts for around two-thirds of the total value of Paraguay's manufacturing output.

While commercial agriculture has made considerable progress, subsistence farming is still prominent in Paraguay. Soils and climate are favorable for the production of forest products, livestock, and many important subtropical crops. However, the development of agriculture and forestry has been slow because of the country's limited transportation and marketing facilities, inadequate technical training, shortage of capital, poorly distributed population, and insecure land tenure.

## POPULATION AND PHYSICAL FEATURES

Geographically, much of Paraguay is characterized by mild temperatures, ample rainfall, and good soils which would allow for expanded agricultural production. But Paraguay's people are concentrated in a small central area, while the outerlying regions are thinly populated.

### Area and Population

Paraguay covers approximately 157,000 square miles, an area slightly smaller than California. It is an inland country bordered by Bolivia, Brazil, and Argentina.

The population of Paraguay is estimated at 1.8 million. It has increased an average of 2.3 percent annually since the Chaco War with Bolivia ended in 1935. Approximately two-thirds of the population live in rural areas, about 60 percent of which is concentrated near Asunción in eastern Paraguay.

### Topography

The Paraguay River traverses the country from north to south and divides it into two natural areas -- the Chaco and eastern Paraguay.

The Paraguayan Chaco, which extends northwest from the junction of the Pilcomayo and Paraguay Rivers, is a low, nearly level plain drained by sluggish and unnavigable rivers.

Eastern Paraguay is a more complex area, and lies between the Paraguay and Upper Paraná Rivers. The easternmost portion is made up of the Paraná Plateau with elevations up to 2,000 feet. The plateau is bordered on the west by rolling plains, which become occasionally hilly with swamplands along some of the low-lying river areas. Most of Paraguay's crop production and much of its livestock industry have developed in this region of rolling plains.

### Climate

Paraguay's climate can best be described as subtropical. On occasion, the temperature drops far enough for frost to damage agricultural crops, but generally the temperature hovers between 55° and 85° F. Total yearly rainfall averages 30 to 80 inches, depending on the area.

The eastern part of Paraguay gets considerably more rain than does the Chaco area. The section along the Upper Paraná receives about 80 inches per year. At Asunción on the Paraguay River the rainfall averages around 55 inches. The middle of the Chaco gets about 30 inches per



Almost all of Paraguay's farmland is gently rolling terrain such as this.

year and usually has a winter dry spell. All areas of the country receive more rain during the summer growing season than in winter, although much of the rain falls in heavy downpours and is not retained in the soil.

Temperatures, on the other hand, are more uniform between the different areas. The average temperature at Encarnación, on the Upper Paraná, is about 69° F., and 76° F. at Mariscal Estigarribia in the Chaco. The daily temperature range is fairly great -- over 20 degrees in eastern Paraguay, with occasional freezing temperatures on winter nights. Summers are fairly hot, with 3 months which average about 80° F. In winter, temperatures average between 60° and 65° F.

## Soils

The most usable soils for agricultural purposes are found east of the Paraguay River. The present principal crop growing section, which radiates east from Asunción, is a region of naturally good soils. Despite some depletion from overcropping, adequate yields can still be obtained in this area when good soil management practices are used. The 75-mile-wide strip along the Upper Paraná, north of Encarnación, remains a virgin forest. This Paraná Plateau region is covered by a fertile basaltic-derived soil. Its topsoil averages 24 to 30 inches in depth. Most of the rest of eastern Paraguay is suitable for livestock grazing, with small pockets good for crop raising.

Although the soils of the Chaco region, west of the Paraguay River, have an ample amount of all the essential elements, this low-lying region is plagued by floods and dry periods. The Chaco soils are composed of geologically new materials washed down from the Andes. Along with a high water table, an oversupply of magnesium sulfate and other salts makes it difficult to use the Chaco region for the growing of agricultural crops.



TABLE 1. -- Distribution of area and population, by regions and departments, 1950

Region and Department	Area sq. mi.	Population		
		Urban	Rural	Total
		<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
Capital:				
Asunción. . . . .	77	201.3	5.3	206.6
North:				
Concepción . . . . .	6,968	20.1	42.2	62.3
San Pedro . . . . .	7,720	13.1	51.4	64.5
Caaguazú . . . . .	8,343	14.3	57.4	71.7
Amambay . . . . .	4,992	5.6	12.6	18.2
	<u>28,023</u>	<u>53.1</u>	<u>163.6</u>	<u>216.7</u>
Central:				
Cordillera . . . . .	1,910	23.4	121.8	145.2
Paraguarí . . . . .	3,186	28.1	131.1	159.2
Central . . . . .	1,024	44.1	123.7	167.8
Guairá . . . . .	1,236	27.8	62.5	90.3
Caazapa . . . . .	3,665	11.1	62.0	73.1
	<u>11,021</u>	<u>134.5</u>	<u>501.1</u>	<u>635.6</u>
Misiones:				
Misiones . . . . .	3,024	13.6	29.9	43.5
Neembucú . . . . .	5,353	11.3	39.5	50.8
	<u>8,377</u>	<u>24.9</u>	<u>69.4</u>	<u>94.3</u>
Alto Paraná:				
Alto Paraná . . . . .	7,815	1.9	7.6	9.5
Itapúa . . . . .	6,379	28.0	83.4	111.4
	<u>14,194</u>	<u>29.9</u>	<u>91.0</u>	<u>120.9</u>
Chaco:				
Presidente Hayes . . . . .	22,574	4.7	18.8	23.5
Boquerón . . . . .	64,860	9.7	18.4	28.1
Olimpo . . . . .	7,880	1.6	1.1	2.7
	<u>95,314</u>	<u>16.0</u>	<u>38.3</u>	<u>54.3</u>
Total . . . . .	157,006	459.7	868.7	1,328.4

Boletín Estadístico del Paraguay, Ministerio de Hacienda, Asunción, No. 1, 1957.

## PRODUCTION

The total volume of all agricultural output has increased an estimated 50 percent since the prewar (World War II) period, and population has risen about 85 percent.

According to available figures, there has been considerable expansion in the livestock industry. Largely because of an increase in the percentage of cows milked, milk production has grown until it is about double the prewar average. Beef output has also risen somewhat.

Crop production, meanwhile, is about 40 percent higher than prewar. Among the subsistence crops -- relatively more important than commercial crops -- mandioca and corn have tended to expand in line with population increase. The other subsistence crops of some consequence -- sweetpotatoes, cowpeas, oranges, and peanuts -- have not changed materially.



Above, native criollo stock. This type predominates on Paraguay's ranches. Left, oxen are principal draft power in the country. The sugarcane and the wild "coco" palm shown in the background are important sources of cash income for farmers.

Several important commercial crops have expanded, especially, rice, wheat, tung nuts, and sugarcane. Sugarcane is the only one of these four crops produced primarily in the central farming zone; the rest have mainly developed in the Encarnación area, in the southeastern part of the country.

## Livestock and Products

Livestock. -- The raising of cattle holds a prominent position in the Paraguayan economy. Other types of livestock are found in Paraguay, but are of much less significance. Cattle are produced mainly for their meat, but also for milk or for work animals.

TABLE 2. -- Livestock numbers, selected years

Type	1938	1951	1956	1957	1958	1959
	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head
Cattle <sup>1</sup> . . . . .	3,351	3,857	4,095	3,929	3,703	3,666
Horses . . . . .	( <sup>2</sup> )	349	337	327	307	292
Sheep and goats . . . .	195	<sup>3</sup> 210	233	207	<sup>3</sup> 205	<sup>3</sup> 200
Hogs . . . . .	36	<sup>3</sup> 42	57	68	<sup>3</sup> 73	<sup>3</sup> 77
Mules and donkeys . . .	( <sup>2</sup> )	24	27	<sup>3</sup> 27	27	25

<sup>1</sup>Some sources feel cattle numbers are considerably higher than these official figures indicate.

<sup>2</sup>Not available.

<sup>3</sup>Estimated.

STICA and other official sources.



The native stock, called criollo, was brought in by the early Spaniards and is a rangy, hardy animal able to adjust to the Paraguayan subtropical climate. Sometime ago, Zebu cattle were imported from Brazil and crossed with the local strains and beef breeds from several other countries have been introduced in recent years for crossing with the native cattle, but criollo stock still makes up most of the total.

Cattle are well distributed all over Paraguay, with the exception of the heavily forested Alto Paraná region and the far reaches of the Chaco. About 55 percent are grown in eastern Paraguay and the rest are in the Chaco.

Cattle numbers are probably below the middle 1950's but above prewar. The number of head slaughtered has been rising fairly steadily. The average animal weighs about 750 pounds (live weight) and is 6 years of age when slaughtered. Beef steers weigh an average of 850 pounds at the time of slaughtering. Few cattle are exported live from Paraguay through normal trade channels.

Parasites and diseases do extensive damage to Paraguay's cattle and little is done about them except on some of the larger ranches. Foot-and-mouth disease, anthrax, brucellosis, tuberculosis, and external parasites, particularly ticks, are among the worst. Others are clostridial infections, internal parasites, and pasteurellosis.

Sheep and goat numbers have not increased for many years. There is no export trade in live sheep or goats. Numbers of hogs, kept principally by farmers on small farms, have been rising. Some poultry are raised in Paraguay, mainly by small farmers.

Horses are used for riding purposes in the rural areas rather than for draft power on farms. Numbers of burros and mules are limited.

Livestock Products. -- Meat and meat products stand first among Paraguay's agricultural exports and are an important item in the Paraguayan diet. Yearly meat output now amounts to about 140,000 metric tons, mostly beef and veal. Hides and skins, dairy products, and some lard, tallow, poultry, and eggs are also produced.

Under a quota system, a certain number of cattle may be slaughtered for export; the majority goes for internal consumption. Annual average per capita meat consumption of 157 pounds places Paraguay just behind Argentina and Uruguay as a meat eating country in Latin America and about equal to the United States. Cattle for slaughter are not graded as a rule and lose considerable weight in being brought to market.

A few large packing plants slaughter for export. In 1958, canned meats accounted for 70 percent of all exchange earnings from meat and meat product exports. A variety of other meat items, such as soup stocks, meat extract, and canned tongue, is also exported. The United Kingdom and the United States are the major purchasers of Paraguay's canned meats.

Hides are produced mainly as a byproduct of the meat industry and follow its ups and downs. Most of the cattle hides produced -- around 600,000 each year -- are exported. Hides and skins were second as an agricultural export in 1959 and furnished 12 percent of all foreign exchange earned by Paraguay in that year. Most of this was from hides, for exports of skins are not of large value. The best and most consistent export markets are in Western Europe and the United States. Hides are usually salted for export.

Paraguay's dairy industry has been expanding and per capita consumption has been increasing. Milk output was estimated at 132,000 metric tons in 1958 compared with a prewar average of around 65,000 tons. The number of cows being milked has grown to approximately 500,000, a large proportion of which are kept by small farmers and villagers in eastern Paraguay. The stock is mostly criollo-type. Some 30 percent of the fluid milk production is estimated to go into the making of cheese, used primarily in the preparation of various dishes. Most of the rest is consumed as fresh milk, and is often put in coffee and yerba mate or on corn and mandioca. Only a small percent of the milk goes into the making of butter.

Among the few other livestock products of some importance in Paraguay is lard. Output is around 3,000 metric tons annually. Beef tallow and grease are produced, with about three-fourths used for cooking and the remainder for candle and soap making. Some 200 tons of wool are sheared each year as a rule. Annual egg production is estimated at 1,700,000 dozen eggs.

## Cash Crops

Cotton. -- Cotton is the principal source of cash for the small farmer. Production is only slightly higher than it was during the prewar period despite considerably more planted acreage. Minimum price guarantees were placed on cotton in 1941. Production reached a postwar peak in

1952, but yields have since decreased, mainly because of insect and disease damage.

Much of Paraguay's cotton is grown by small farmers in the main agricultural area east of Asunción. Some is also grown in the corner of the country where the Upper Paraná and the Paraguay Rivers come together and on the Mennonite colonies in the Chaco. Practically all of Paraguay's cotton except for that produced in the Chaco is of the short-staple lengths.

Domestic demand is increasing gradually, leaving a smaller surplus available for export.

Sugarcane. -- Sugarcane is now Paraguay's second most important cash crop, and sugar exports have been substantial during some recent years.

The main production area is situated in and around the major farming zone. Cane is cut and crushed between June and October as a rule. The crop is sometimes reduced by sudden cold snaps and frost. Practically all of the sugar produced in Paraguay is white, centrifugal sugar. Cane sirup, alcohol, and distilled liquors are also made from the sugarcane crop. Some of the cane tops are used for livestock feed.

Minimum prices have been in effect for some time on sugarcane production and are administered by the Mixed Sugar Commission, composed of both government and trade representatives. The Commission also buys sugar from the mills at a fixed price and sells it to retailers under controlled quantity and at fixed prices.

Sugar exports from Paraguay are faced with domestic prices and transportation costs that are high compared with prices on the world market. Chances for future expansion of Paraguay's sugar industry will be greatly dependent on whether or not this relationship becomes more favorable.

Tobacco. -- Another cash crop is tobacco, relatively less important than cotton and sugarcane.

Tobacco production fluctuates up and down, but has not changed much on the average. Some of the tobacco grown is a light, fairly mild type called Flojo, mainly for export. It finds its best market in Western Europe. A large proportion of the dark domestic tobacco goes into the making of cigarettes, demand for which has been steadily increasing at the expense of cigars and other tobacco products.

Exports of Paraguayan tobacco have been handicapped because of poor curing methods and grading practices. Whether Paraguay's tobacco exports can increase will depend largely on whether these deterrents continue.

Coffee. -- A commercial coffee operation has been developing, mostly near Pedro Juan Caballero in the northeast. An estimated 5,000,000 new trees have been planted in this area and more of these trees are coming into bearing each year. Most of the crop is being exported, as domestic needs are small. About 800 metric tons of coffee were produced in 1959.

TABLE 3. -- Planted area and production of principal crops, averages prewar and 1952-54, annual 1955-58

	Planted area <sup>1</sup>						Production					
	Prewar average	1952-54 average	1955	1956	1957	1958	Prewar average	1952-54 average	1955	1956	1957	1958
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons	1,000 metric tons
Mandioca. . . . .	124	149	150	152	158	163	548	946	940	950	973	995
Cotton, raw . . . . .	85	133	123	120	124	143	30	44	39	36	33	33
Corn. . . . .	154	216	208	228	247	259	71	114	101	120	130	130
Sugarcane . . . . .	28	33	32	35	44	48	282	361	305	380	490	550
Tobacco . . . . .	21	19	23	14	12	11	8	8	10	6	5	5
Rice, rough . . . . .	8	21	24	22	25	20	4	18	18	19	23	20
Sweet potatoes . . . . .	20	19	19	19	19	19	80	75	75	75	75	75
Cowpeas . . . . .	47	51	54	56	56	55	19	18	18	18	18	18
Peanuts . . . . .	29	29	26	26	30	29	12	10	10	10	11	11
Wheat . . . . .	9	4	5	9	22	37	1	1	1	3	7	12

<sup>1</sup>Planted area is for harvest completed in year indicated.

<sup>2</sup>Seed cotton.

*Manual Estadístico del Paraguay*, Ministerio de Agricultura y Ganadería, STICA Boletín No. 218, March 1958, in most cases; also USDA sources, and estimates.



## Grains

Corn. -- By far the leading grain crop, corn is grown both for food and for feed. Area planted and production have risen above the prewar level and Paraguay is exporting corn.

During the recent years, production has averaged considerably more than the prewar average. Most of this increase was due to expanded acreages as corn has been under price supports for several years. Some yellow varieties are now planted, but a large share of the corn grown is the native white corn.

Paraguayans often eat corn in hominy form or make it into a type of corn bread. Average per capita consumption of corn is about 68 pounds annually. An estimated one-third of the crop is normally fed to livestock. In 1958, about 19,000 tons of corn entered the export market, about average for the past few years.

Rice. -- Paraguay's rice output has increased steadily from the prewar average, as both acreages and yields rose. The country is self-sufficient in rice, but per capita consumption is not large.

The most important producing area is located near Encarnación, with close to one-half of the production coming from the two Departments of Itapúa and Misiones. Another one-third of the crop is produced in the four Departments of Cordillera, Paraguari, Caaguazú, and Guairá. A large part of the rice grown is medium grained. It is raised primarily in paddies on large farms; average yields are currently running about 2,200 pounds per acre for the whole country. About 14 pounds is eaten annually by Paraguayans -- much less than either corn or wheat.

Wheat. -- Paraguay has endeavored to expand wheat production for many years, but consumption has increased also. Wheat and flour imports make up about 15 percent of the value of total imports.

Price supports are used and wheat production has risen to about 10,000 metric tons per year, some one-eighth of the total consumption requirements. Several mills are now operating in Paraguay, and most of the commodity purchased outside the country moves in as wheat grain. Wheat is consumed mainly in the urban areas of the country.

Most of the wheat crop is grown in the southern part of eastern Paraguay. Paraguay's climatic conditions are the principal deterrent to higher wheat output, making the grain subject to many diseases and parasites.

Other Grains. -- Barley, oats, rye, and grain sorghums are cultivated, but not in substantial quantities. They encounter many of the same problems that beset the cultivation of wheat and have not become significant factors in the economy of the country. Furthermore, demand for these cereals is low.



Some modern grain silos like these have been built for government use in Paraguay. The ones shown here have a capacity of 2,000 metric tons, and are located in the main crop-growing area, in Villarrica.

## Vegetables

Mandioca. -- Output of Mandioca -- Paraguay's principal subsistence crop -- has gone up steadily. Mandioca, also known as yuca or cassava, is the largest single source of calories in the diet of the average Paraguayan. Nearly every small farmer produces this crop, which can be called the bread of the country.

Production in 1958 was some 80 percent above the prewar average. Population during the same period rose slightly more. Planted area has increased about 30 percent over prewar while yields have gone up around 40 percent over the same period. The average yield is now 13,000 pounds per acre.

Mandioca stem cuttings are planted in the spring and the crop is usually matured by the next winter. The roots will last in the ground for a second year, but new roots are less fibrous and consequently more palatable. The usual procedure is for the housewife to pull or dig up a small amount each day as required. After boiling, the roots are kept until used like bread with meals. Some of the mandioca may also be ground and revolved in water to remove the starch. A considerable portion of the crop is fed to livestock.

Sweetpotatoes. -- Sweetpotatoes, another subsistence vegetable crop, are of much less importance than mandioca. They are dug up when needed, like mandioca, and usually grow in small patches near the house. Sweetpotatoes are either boiled or roasted for eating, and some are fed to livestock. Occasionally small quantities are exported.

Cowpeas. -- Cowpeas are also grown for home consumption in Paraguay. They are a considerably smaller source of calories in the diet of the Paraguayan than sweetpotatoes and a much smaller one than mandioca. Production of cowpeas is nearly the same as prewar.

Peanuts. -- Peanuts are raised primarily by small farmers. Output and acreages have not changed much from prewar levels. Peanuts are mainly eaten in the rural areas, either raw or roasted. Approximately one-fourth of the crop is sold for use in the peanut oil industry.

Other Vegetables. -- A wide variety of other vegetables are cultivated -- beans, peas, squash, pumpkin, potatoes, onions, garlic, lettuce, cabbage, tomatoes, carrots, and many others. Total production of these vegetables is estimated at 75,000 metric tons. About 5,000 metric tons of vegetables, mostly potatoes and onions are imported annually for consumption in the cities.

## Fruits

Citrus Fruits. -- Citrus fruits are the principal type of fruit raised in Paraguay. With its mild, Florida-like climate, eastern Paraguay is naturally well suited for these fruits.

Oranges are the major citrus crop for domestic consumption. At one time they were exported, but plant diseases have been particularly damaging to the orange industry in recent years. A commercial grapefruit industry has been developing, and this constitutes the principal citrus export at the present time. Exports of grapefruit were reported to be worth approximately \$145,000 in 1958. Most of the other citrus fruits, such as limes, lemons, and tangerines, are grown in backyards or along the edges of fields. Some of them are eaten at home, but the best quality fruits enter the urban markets.

Other Fruits. -- Many other fruits are found in Paraguay, and among them bananas are the most important. Banana production is an estimated 30,000 metric tons, of which about 10 percent is exported. Enough pineapples, avocados, and mangoes are grown to furnish the country's needs and some pineapples are now being exported.

## Vegetable Oils

Edible. -- Several edible vegetable oils are produced for domestic consumption. Output of cottonseed oil, the principal edible vegetable oil, has undergone a decline over the last several years, while peanut oil production has fluctuated up and down. The 1956-58 annual average for cottonseed oil production was about 1,700 metric tons. Peanut oil output during the same period averaged approximately 600 metric tons annually. Both of these oils are used as cooking and salad oils, either alone or mixed together. In addition to peanuts and cottonseed, small quantities



of sunflowerseed are grown, mostly in the southern part of the country. All of the edible oil production enters the domestic market and is supplemented by imports. Some of the cake, meal, and expeller left over from the production of cottonseed oil and peanut oil enters the export market.

**Industrial.** -- Several industrial oils are produced, primarily for export. Tung oil production runs about 2,500 metric tons annually. Almost all of this is exported, much of it to the United States. Two more oils are obtained from the fruit of the "coco" palm, which grows wild over much of the country and is collected by small farmers in the off-season. Palm kernel oil is extracted from the kernel, and palm oil is made from the pulp of the golf-ball-sized fruit. Output of palm kernel oil is usually between 2,000 and 2,500 metric tons, while palm oil production has expanded to about 2,000 metric tons annually. Argentina normally takes most of Paraguay's exports of palm oil and palm kernel oil for use in soap making. Castor oil production and exports have averaged a few hundred metric tons in recent years.

**Essential.** -- Essential oils account for between 2 and 3 percent of the total value of Paraguay's exports, somewhat less than industrial oils. By far the most valuable essential oil is petitgrain -- a base for perfumes, perfumed soaps, and flavorings -- distilled from the leaves and young shoots of the wild bitter-orange tree. It is gathered by small farmers in the central farming area as a side cash crop. Other lesser essential oils coming from Paraguay are "palo-santo", "espartille", and "guayacol."

## AGRICULTURAL PATTERNS AND DEVELOPMENT

Agriculture in Paraguay is typified by many small subsistence farmers concentrated near the capital, using antiquated farming methods, and having uncertain property status. Around this central area there are large cattle ranches interspersed with scattered subsistence farms and commercial crop farms. In the remote border regions, extensive tracts of land lie underdeveloped or unused. Few roads or railroads run across the country but, where they do, agriculture is developing. Marketing methods and facilities for the most part are meager. Credit is scarce except for the larger Paraguayan farmer.

### Types of Farming and Farm Practices

For the most part, the small farmers in the central area operate primarily on a subsistence basis, with small acreages set aside for cash crops. Fields are usually small, and erosion is a problem for those farming on the hillsides. There is some fragmentation of the farms into scattered fields.

Outside the central area, farm operations are generally larger and production of agricultural products is often for cash. One of the most prominent commercial crop farming areas in Paraguay is located near Encarnación. Commercial agriculture in general has been slowed by the small size of the internal market, both as regards the total number of consumers and the low per capita income, and also by the transportation problem involved in exporting to foreign markets.

Much of the work on Paraguayan small farms is done with the machete (a long knife) and the hoe. About 60 percent of Paraguay's farmers have metal plows of one sort or another, and many

TABLE 4.-- Imports of selected agricultural supplies, 1957

Commodity	Value
	1,000 dollars
Tractors, incl. agricultural . . . . .	504
Farm machinery . . . . .	371
Farm tools . . . . .	43
Serums and vaccines . . . . .	20
Total . . . . .	938

*Boletín Estadístico del Paraguay*, Ministerio de Hacienda, No. 10-11, 1959.

others use homemade wooden plows, all usually drawn by oxen. Mechanized power is as yet little used. Tractors and most other farm machinery must be imported, and imports remain small.

Fertilizer, selected seeds, and pesticides are likewise little used, although small quantities of these agricultural supplies as well as farm machinery are imported by the Bank of Paraguay for sale at cost to farmers.

Livestock are rarely sheltered and seldom receive concentrates. Some grain is fed, however, and the production of mixed animal feeds is growing; at present it runs approximately 10,000 tons per year. The main local ingredients used in the making of mixed feeds are corn, sorghum, bran, vegetable oil kernels and pulp, dried blood, and meat and bone powder.

## Land Tenure and Use

About 44 percent of Paraguay's farmers are occupants without title to their land; around 33 percent are owner-proprietors; renters make up 7 percent, and multiple tenure arrangements account for the remainder. There is considerable variation in the size of holdings, with the one-third of the farm proprietors who are owners having 74 percent of all acreage in farms.

About 1 percent of Paraguay's total land area of slightly more than 100 million acres is cultivated. The amount of land under cultivation increased 11 percent between 1943 and 1957. During the same period, the area in forests declined, while the acreage in pastures and meadows did not change appreciably. It is estimated that more than 5 million acres are available for future agricultural development in eastern Paraguay; most of this is owned by private individuals.

TABLE 5. -- Land use, 1943 and 1957

Use	1943		1957	
	Area	Share of total	Area	Share of total
	1,000 acres	Percent	1,000 acres	Percent
Cultivated land <sup>1</sup> . . . . .	1,152	1	1,313	1
Pasture and meadow . . . . .	41,521	41	41,513	41
Forests . . . . .	55,253	55	55,084	55
Other . . . . .	2,582	3	2,598	3
Total land area . . . . .	100,508	100	100,508	100

<sup>1</sup>Includes fallow land.

*Censo de Agricultura del Paraguay, 1943-44*, Ministerio de Agricultura y Ganaderia- STICA, Washington, 1948, and *Manual Estadístico del Paraguay 1951-1957*, Ministerio de Agricultura y Ganaderia -STICA, Boletín No. 218, Asunción, 1958.

## Transportation and Marketing

Transportation. -- Historically, transportation has been a serious obstacle to agricultural development in Paraguay.

Only the central farming area has what can be called a modern road system, but even here it is spread thinly. Two all-weather roads run from Asunción into the far reaches of eastern Paraguay. The total present mileage of all-weather roads is about 850 miles, about 10 percent of it hard-surfaced. In addition, there are approximately 3,500 miles of seasonal roads and trails, most of which are passable only by horse or ox cart.

Paraguay has a fairly extensive river network. Navigable domestic water mileage amounts to about 2,000 miles. A large share of Paraguay's foreign trade moves by river between Asunción and Buenos Aires, a distance of 1,000 miles. Most goods moving overseas must be transshipped in Buenos Aires or Montevideo, greatly increasing shipping costs. Charges for moving goods through Argentina are substantial.

There is one cross-country railroad -- the Paraguay Central Railroad -- which extends from Asunción to Encarnación, where a ferry connects with an Argentine track. In addition to this railway there are also several short industrial tracks most of them extending out from the Paraguay River. Forest products and livestock are the principal freight carried by the majority of these tracks. Altogether, there are around 700 miles of railway in Paraguay.



At the present time, some improvements are being made in Paraguay's transportation system. Work is progressing on the Trans-Chaco road, the first into this western half of the country. A new bridge across the Upper Paraná gives Paraguay an outlet to the sea through Brazil. A few new roads are under construction in the Paraguay River area and others are being improved. Direct ocean freight service is now available between Asunción and some overseas ports. Further vigorous efforts to improve transportation facilities would do much to encourage the development of Paraguay's agriculture.

Marketing. -- Paraguay's marketing facilities and procedures result in considerable loss of farm products, retard the growing of high-quality farm products, and increase the costs of production.

Adequate on-the-farm storage facilities seldom exist, necessitating the immediate use of many products on the smaller farms. Other commodities are often stored by using any available space. Corn, for example, is often hung by its husks in trees or under the roofs of rural dwellings. Meat is bought fresh daily in the rural villages, but on the farms may be kept hanging up in the open or dried for future use. Several government storage silos have been built having a total capacity of about 15,000 metric tons. There are also two cold storage plants in Asunción. Quite a few of the private agricultural processing concerns have storage facilities for their products.

Grading practices are not used in the marketing of most agricultural products. Incentives to produce better commodities are few and the low quality of most agricultural products makes it difficult for them to enter the world market.

The major processing industries in order of value of output are: meats; textiles; milling and baking; sugar and sugar products; liquors, wine, and beer; tanning; oils; and tobacco products.

## Agricultural Training and Research

The average Paraguayan farmer has little opportunity to obtain technical knowledge in improved farming practices and the general educational level in the rural areas is limited.

Although primary education is free and compulsory for children between 7 and 14, it is difficult to enforce because of the necessity for many children to work and because schools are not available for others. A total of five special agricultural schools are located in rural areas.

College level training in agriculture began for the first time in 1956 with the establishment of a College of Agriculture, 15 miles east of Asunción. About 125 students are being taught there by 35 part-time teachers. Several other students have been sent to the United States and other foreign countries under the auspices of both the Servicio Técnico Interamericano de Cooperación Agrícola (STICA), a joint U.S.-Paraguayan venture started during World War II, and the Food and Agriculture Organization (FAO) of the United Nations.

Agricultural research is largely carried out by STICA, which operates under the Ministry of Agriculture and Livestock. STICA has concentrated on seed and variety improvement, plant and animal disease control, crop diversification, livestock breed improvement, and better agricultural practices. Research centers operated by this joint U.S.-Paraguayan organization include an experiment station at Caacupé, east of the capital, and a demonstration beef ranch near Encarnación. A soil testing laboratory and an artificial insemination center are located close to the site of the agricultural college.

Under a supervised agricultural credit program, some 200 agricultural supervisors cover the rural areas to give guidance to farmer borrowers. These supervisors work under the Crédito Agrícola de Habitación (CAH). About 90 rural youth groups similar to the 4-H Clubs, with a total membership of 2,000, have been organized with STICA assistance. In addition, the Ministry of Agriculture has a separate agricultural extension service. Most of the Departments have one or two extension agents to give technical advice to farmers.

## Farm Credit Facilities

Lack of capital is a major handicap for Paraguay's farmers. As would be expected, private savings in Paraguay are very small. Credit, limited to start with, has become increasingly tight in the last few years. Medium and long-term agricultural credit facilities are especially scarce.

One of the principal sources of credit for Paraguayan farmers has been the Bank of Paraguay, an autonomous government agency which functions under the Central Bank. Almost all of its loans have been of less than a year's duration and tended to be mainly crop loans for the larger

farmers. About four-fifths of the total value of all agricultural loans made by the Bank of Paraguay went to the crop production sector of the economy in 1959. A new National Development Bank is reportedly being established and is to replace the Bank of Paraguay as a source of agricultural credit.

A second credit source for Paraguayan agricultural producers is the foreign commercial banks. These banks make most of their agricultural loans to cattle raisers. Some agricultural credit is also obtained from private Paraguayan sources.

CAH, set up in 1943, was designed to meet the capital needs of small farmers who have no other source of funds. Possibly, 15,000 farmers have received assistance under CAH, with the average loan being in the neighborhood of \$175. The total value of all loans made by CAH has fluctuated considerably from year to year.

## Government Agricultural Policies

The government has established a number of policies designed to develop agriculture in the underpopulated regions, to raise food consumption levels, to control prices, to increase agricultural exports, and to provide revenue. These policies may be lumped into three broad categories: land programs, production and internal market controls, and foreign trade regulations.

Land Programs. -- A number of laws have been passed affecting Paraguay's land situation. Shortly after the Triple-Alliance War of 1865-70, measures were passed which resulted in heavy concentration of land ownership. During this period, large amounts of public lands were sold to private individuals and companies in order to provide badly needed government revenue.

The first settlement law was enacted in 1904. Under its terms, several colonies of European immigrants were established in Paraguay. Altogether, about 39,000 persons immigrated into Paraguay between 1904 and 1940.

Decree 120 was passed on February 29, 1940, for the purpose of redistributing the land and the establishment of colonies. Expropriation was provided for in cases where agricultural land was not being used for agricultural purposes and was occupied by a group of 20 or more farmers without title to the land. The Agrarian Reform Institute (IRA) was placed in operation in 1951 to handle Paraguay's land distribution, immigration, and land settlement programs.

Since 1900, Paraguay has granted title to approximately 20,000 farms under its various land programs. Some 145 national colonies, most of them in eastern Paraguay, and 45 private colonies had been established by the end of 1959. Many of the national colonies are made up of former occupants without title, while the private colonies consist mainly of foreign immigrants.

Immigration into Paraguay during the past 4 years (1956-59) has averaged 1,460 annually. A newly signed treaty with Japan allows for a total of 85,000 Japanese immigrants to settle in Paraguay over the next 30 years at a maximum rate of 3,500 for any one year. The Japan Overseas Emigration Corporation, which will help handle the program, has purchased 200,000 acres in the Department of Alto Paraná for this purpose.

Production and Internal Market Controls. -- The Paraguayan Government has attempted to increase agricultural production and at the same time keep consumer prices down by using a multitude of controls.

In the case of meats, quotas are in effect on the number of head of cattle that may be slaughtered each year for export. This is done to assure an ample supply of low-priced meat for Paraguayan consumers. Paraguay's meat industry is controlled by the Paraguayan Meat Corporation (COPACAR), a joint private industry-government corporation. In addition to enforcing the export quotas, COPACAR regulates live cattle and meat prices, operates domestic slaughterhouses in the principal marketing centers, and collects a special tax on all cattle slaughtered for export.

Guaranteed producer prices are in effect for several crops, notably cotton, sugar, tobacco, corn, wheat, rice, and peanuts. These have not always been effective in stimulating an increase in area planted. Attempts have also been made to raise production of agricultural crops by assigning yearly acreage allotments to various agricultural districts. Total acreage actually planted has usually been less than quotas assigned.

Foreign Trade Regulations. -- Paraguay's complicated multiple exchange rate system was greatly simplified in March 1956 when the par value of the guarani was reduced from 21 to 60 per U.S. dollar. In August 1957, the system was abandoned and a free exchange market established. Since then, all transactions have been made at the free rate, plus exchange surcharges on most imports except from bordering countries and Uruguay or minus exchange taxes on exports.



Under the free exchange system, the selling rate was for a time maintained at about 111 guaranis to the dollar, as compared with the former rate of 60 for essential imports and 85 for nonessential imports. The rate dropped further to 122 per dollar in early 1959 and to 126 in September 1960.

Import surcharges, introduced in February 1959, were increased later to 20 percent. These are in addition to the usual tariff fees. Prior deposits are required on most goods except wheat, wheat flour, dairy products, a few nonagricultural items, and imports made by government agencies or for charitable institutions. These deposits range up to 200 percent on raw agricultural items, depending on the degree of competitiveness and need. Deposits are retained for 120 days if paid before the goods are shipped or 180 days if paid after. No import licenses are needed in most cases.

On the export side, export taxes of 10 percent on the f.o.b. Paraguayan port value are currently levied on all exports except quebracho. Several domestic consumption items, sugar, rice, peanuts, edible fats, soap, bone and bonemeal, as well as meat, are subject to export quotas and must have prior permits.

## FOREIGN TRADE

### Exports

Agricultural products account for a large part of the total value of Paraguay's exports.

At the present time, meat and meat products are the most important agricultural export. In 1959 they amounted to 31 percent of all exports. Hides and skins followed as an agricultural

TABLE 6. -- Principal agricultural exports, 1957-1959

Commodity	Quantity			Value		
	1957	1958	1959	1957	1958	1959
	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>	<i>Mil. dol.</i>	<i>Mil. dol.</i>	<i>Mil. dol.</i>
Meat & products . . . . .	8.6	18.6	19.3	3.7	8.2	9.6
Hides & skins . . . . .	7.8	9.9	12.6	1.6	2.0	3.6
Cotton lint. . . . .	8.9	8.2	6.4	4.5	3.7	2.1
Vegetable oils . . . . .	6.5	6.5	6.7	2.2	1.5	1.7
Sugar . . . . .	-	5.2	15.5	-	.6	1.1
Essential oils . . . . .	.3	.2	.3	1.3	.8	1.0
Coffee . . . . .	-	(1)	1.3	-	(2)	.7
Tobacco . . . . .	2.8	2.5	2.5	1.0	.7	.6
Corn. . . . .	23.3	19.2	12.0	1.2	.7	.4
Oilseeds. . . . .	31.3	2.6	5.2	3.1	.2	.3
Oilseed cakes, meal and expeller. . . . .	38.6	10.3	10.0	3.3	.3	.2
Fruit . . . . .	5.8	5.2	4.4	.4	.3	.2
Other agricultural . . . . .				.4	.3	.5
Total agricultural. . . . .				16.7	19.3	22.0
Other exports <sup>4</sup> . . . . .				16.2	14.8	9.2
Total exports. . . . .				32.9	34.1	31.2
				<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Agr. as percent of total exports . . . . .				49.2	56.6	70.5

<sup>1</sup>Less than 50 tons.  
Paraguay, May 1960.

<sup>2</sup>Less than \$50,000.

<sup>3</sup>Taken from Boletín Estadístico Mensual, Banco Central del Paraguay, May 1960.  
<sup>4</sup>Includes quebracho extract, yerba mate, and raw logs. In 1959 these were valued at \$8.1 million.

Boletín Estadístico Mensual, Banco Central del Paraguay - Departamento de Estudios Económicos, April 1960.

export in 1959, making up 12 percent of the total. Next came cotton lint, 7 percent; vegetable oils, 5; sugar, 4; essential oils, 3; coffee, 2; and tobacco, 2 percent. Exports of corn; oilseeds; oilseed cake, meal, and expeller; and fruit were each 1 percent of the total.

The United States and the United Kingdom are the main markets for Paraguay's agricultural exports, followed by the Netherlands, Argentina, and West Germany. Several other Western European countries, Panama, Uruguay, and Canada are also important markets.

## Imports

About one-fourth of Paraguay's imports are agricultural. Wheat and wheat derivatives are the major agricultural import. In 1959, Paraguay imported 72,500 metric tons of this commodity, mostly as grain for processing within the country. Imports of wheat and its derivatives ordinarily constitute around 15 percent of the value of total imports.

The next most valuable agricultural import is dairy products. Most of this is milk, in some form. Canned goods, fresh fruit, vegetables, and wool are also imported. Several other agricultural commodities enter in lesser amounts.

TABLE 7. -- Principal agricultural imports, 1957-1959

Commodity	Quantity			Value		
	1957	1958	1959	1957	1958	1959
	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>	<i>Mil. dol.</i>	<i>Mil. dol.</i>	<i>Mil. dol.</i>
Wheat and wheat derivatives . . . . .	71.3	64.2	72.5	4.5	4.0	4.4
Dairy products . . . . .	2.6	1.2	1.6	1.2	.6	.6
Canned goods . . . . .	.6	.9	.4	.2	.2	.1
Fruit . . . . .	1.4	.8	1.0	.2	.1	.1
Onions . . . . .	1.4	.9	1.0	.1	(1)	.1
Wool . . . . .	.2	(2)	.1	.3	.1	.1
Other agricultural				1.9	.7	.6
Total agricultural				8.4	5.7	6.0
Other imports				19.0	26.9	20.2
Total imports				27.4	32.6	26.2
				<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Agr. as percent of total imports				30.7	17.5	22.9

<sup>1</sup>Less than \$50,000.

<sup>2</sup>Less than 50 tons.

*Boletín Estadístico Mensual*, Banco Central del Paraguay - Departamento de Estudios Económicos, May 1960.

## Paraguayan-U.S. Agricultural Trade

About 25 percent of Paraguay's foreign exchange earnings are acquired in trade with the United States. Some 65 percent of Paraguay's total exports to the United States are agricultural. Canned beef amounted to approximately one-half of the value of total shipments to the United States in 1959. In the same year, 5 percent consisted of petitgrain oil and 4 percent of tung oil.

On the other hand, only a very small share of Paraguay's imports from the United States are agricultural. These are usually small quantities of nonfat dry milk, corn meal, wheat or its derivatives, and hops, among others. Paraguay uses its dollar earnings mainly to buy machinery, vehicles, textile manufactures, and other manufactured goods from the United States.



## OUTLOOK

In topography, climate and soil, Paraguay is suited for the growing of many subtropical and other agricultural products. However, many formidable obstacles exist which must be overcome if the country's agriculture is to be further developed substantially. Transportation bottlenecks must be broken, more marketing incentives must be found, agricultural training must be improved, and more capital must be made available. The land tenure problem must be solved and the outer-lying areas must be settled. When these stumbling blocks are eliminated, Paraguay can begin to realize its promise of agricultural abundance.

